Credentialing, validation and provenance in clinical research use of Pathology imaging

A variety of quality control procedures are carried out in groups that make use of Radiology images as biomarkers and/or to measure clinical endpoints. These quality control procedures encompass calibration of imaging modalities, assessment of image quality, analysis of sets of submitted information regarding each study participant to make sure that the submitted information is complete and consistent. Quality control procedures also often include assessment of inter-observer variability between people or algorithms used to carry out image interpretation. Analogous issues will need to be faced as we move towards the quantitative interpretation of digital Pathology images. In this session, we will aim to define key issues that have to be addressed to enable quantitative research use of digital Pathology images. This session will cover credentialing, validation and provenance involved in the use of Pathology imaging in clinical studies.

Standards and image handling in whole slide imaging and TMA -- Traditional and emerging Path imaging methods

In this session, we will attempt to survey different kinds of digital pathology related metadata to be collected and managed and will also survey existing schemes and standards used to represent this information. The scope of information will include: 1) source of specimen, 2) how the specimen was obtained and processed, 3)hardware and software protocols used to obtain the image, 4) how the image is stored and compressed, 5) human classification of specimen/image, 6) software/algorithm stack used to characterize/classify the image, 7) detailed representation of annotations/markups generated by human/algorithm observers. This session will include discussion of DICOM Working Group 26, OME formats, Pathology Analytical Imaging Standards and the use of Dynamic Extensions for managing additions, extensions and modifications to data models. The session will address whole slide, tissue microarray specimens.

Image processing and validation

In this session, we will survey the state of the art in Pathology image analysis and validation. Critical issues include: 1) ability of image analysis algorithms to match human classification schemes, 2) analysis that directly link results of image analysis algorithms to patient outcomes, 3) reproducibility of classification results obtained using a given set of algorithms and 4) comparisons between results produced by different collections of algorithms. Integration with other sources of information including clinical, genomic, proteomic, radiology data.

We will discuss methodology issues that arise from the growing collection of studies that involve analysis of Pathology data in a broad integrative context. For instance, in the US TCGA project, brain tumor analyses are carried out using datasets that include digital pathology and Radiology data, a variety of data from “omic” platforms, treatment and outcome data.

People and the groups we assigned them are listed below:

1. if you flesh out the above we can send it around to all participants this week
2. If you email those in 1 and 2 I will email those in 3 and 4 to ask them to prepare a 5-7 minute presentation